

Papahānaumokuākea Marine National Monument Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: Matthew Iacchei

Affiliation:

University of Hawaii, Manoa
Department of Zoology
Hawaii Institute of Marine Biology (HIMB)

Permit Category: Research

Proposed Activity Dates:

On board Hi'ialakai: tentatively, 06/04/08 - 06/28/08 and 07/31/08 - 08/28/08
On board Oscar Elton Sette: tentatively, 08/14/08 - 09/02/08
On board NMFS/PIFSC lobster tagging cruise: tentatively, 08/02/08 - 09/05/08

Proposed Method of Entry (Vessel/Plane):

HIMB-NWHI Cruise and Maritime Heritage Cruise: Hi'ialakai
PSD Monk Seal Camps Cruise: Oscar Elton Sette
NMFS/PIFSC lobster tagging cruise: Vessel to be determined by NMFS/PIFSC lab

Proposed Locations:

All activity will take place between 5 and 65 meters depth.

All possible locations: Nihoa Island, Necker Island, French Frigate Shoals, Gardener Pinnacles, Maro Reef, Laysan Island, Lisianski Island, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll.

Maritime Heritage cruise will visit: French Frigate Shoals, Pearl and Hermes Atoll, Midway Atoll, Kure Atoll

PSD Monk Seal Camps Cruise will visit: TBD

HIMB-NWHI Cruise will visit: TBD

NMFS/PIFSC lobster tagging cruise will visit: Necker Island, Maro Reef, Laysan Island, Gardener Pinnacles

Estimated number of individuals (including Applicant) to be covered under this permit:

25

Estimated number of days in the Monument: 109 total ship days in the monument (this represents all vessel days, for instance counting 2 days when two vessels are in the Monument on the same day)

Hi'ialakai HIMB NWHI Cruise: 25 days

Hi'ialakai Maritime Heritage Cruise: 29 days

Oscar Elton Sette PSD Monk Seal Camps Cruise: 20 days

NMFS/PIFSC lobster tagging cruise: 35 days

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

The proposed activity would utilize mitochondrial and microsatellite DNA markers to identify stock structure and estimate population connectivity among atolls and banks for six lobster species throughout the Hawaiian archipelago: *Panulirus marginatus*, *Panulirus penicillatus*, *Scyllarides squammosus*, *Scyllarides haanii*, *Parribacus antarcticus*, and *Arctides regalis*. In addition this work will assess temporal and spatial variability in genetic diversity for *P. marginatus* and *S. squammosus* at four banks in the NWHI: Maro Reef, Necker Island, Laysan Island, and Gardener Pinnacles.

b.) To accomplish this activity we would

To accomplish this activity I would use both trapping and SCUBA diving methods to non-lethally collect 50 tissue samples (lobster legs) per species per bank for all banks in the NWHI. DNA would be extracted from each tissue sample, and each lobster would be genotyped using 1 mitochondrial and a minimum of 10 nuclear microsatellite DNA markers. These genotypes would then undergo statistical analyses to determine for each species whether or not stock structure exists in the Hawaiian archipelago or if the species has one panmictic population in Hawaii. For those species with stock structure, I would determine the relative magnitude and direction of connectivity among the banks and atolls in the archipelago.

c.) This activity would help the Monument by ...

This activity would help the Monument by directly addressing one of the principal management needs of the Monument: to understand archipelago-wide connectivity of coral reef species. *P. marginatus* is an endemic lobster species in Hawaii that historically supported a valuable marine fishery in the state (along with *S. squammosus* and *S. haanii*). Ongoing lobster tagging studies targeting *P. marginatus* and *S. squammosus* at four banks in the NWHI (Laysan, Gardener, Maro, Necker) have yet to find any evidence of adult individuals of either species moving between banks over multiple years (O'Malley et al unpublished data). This suggests that any exchange of individuals between island populations in the Monument occurs during the larval

phase. My research will determine whether each of these banks is self-sustaining or exchanging larval individuals with other banks in the Northwestern or Main Hawaiian Islands. New analysis techniques will enable me to determine both a direction and a relative magnitude of this exchange wherever it occurs. This information will be beneficial for all lobster species in the study. Managers will gain a better understanding of whether the protection of the Monument will allow the rejuvenation of lobster stocks in the NWHI, and if the Monument may also enhance lobster populations in the main islands. While extraction of lobsters is no longer permitted in the NWHI, there is no way to prevent natural or broad scale anthropogenic effects that may damage lobster stocks (i.e. oil spills or disease outbreaks) from occurring. Knowledge of whether and how lobster populations on various banks are connected will enable managers to rapidly implement the most beneficial contingency plan in case one of these events occurs.

In addition to the direct benefits to the management of the Monument discussed above, my research will utilize the uniqueness of this large and isolated marine reserve and the lobster species contained within to address some of the most critical gaps in the science of designing effective marine reserves.

Other information or background: